Claims

1. A cellular telephone network comprising peripheral branches and a central high-capacity data trunking region and using a synchronous data communication protocol and wherein said high-capacity data trunking region comprises a satellite interface for a satellite connection using a non-synchronous data communication protocol.

2. A cellular telephone network according to claim 1, wherein said high capacity trunking region comprises a terrestrial high capacity trunking connection in parallel with said satellite connection such that said satellite connection is usable to back up said terrestrial connection.

3. A cellular telephone network according to claim 1 wherein said synchronous data communication protocol is the E1 data protocol and the asynchronous data communication protocol is the TCP/IP data communication protocol, and wherein said satellite interface comprises an E1 – TCP/IP converter.

4. A cellular telephone network according to claim 3, wherein said high capacity trunking region comprises a terrestrial high capacity trunking

connection in parallel with said satellite connection such that said terrestrial high capacity trunking connection is usable to back up said satellite connection.

5. A cellular telephone network according to claim 2, wherein the synchronous data communication protocol is the E1 protocol and the asynchronous data communication protocol is the TCP/IP protocol and wherein said interface comprises E1 – TCP/IP converters.

6. A cellular telephone network according to claim 3, wherein said E1 - TCP/IP converter comprises a multiplexer for converting between the E1 signal and the TCP/IP signal.

7. A cellular telephone network according to claim 1, wherein said satellite link is via geostationary orbit satellite.

8. A cellular telephone network according to claim 5, wherein said E1 - TCP/IP converter comprises a multiplexer for converting between the E1 signal and the TCP/IP signal.

9. A cellular telephone network according to claim 5, wherein said converter is operable to receive E1 signaling containing SS7 control signaling distributed therein at a predetermined data rate, said converter comprising

an extractor for extracting said SS7 signaling, and

a TCP/IP packet former for arranging said extracted signaling into TCP/IP packets.

10. A cellular telephone network according to claim 7, wherein said converter comprises an encoder for encoding synchronization control data describing said E1 signal into headers of TCP/IP packets, thereby to enable subsequent synchronous reconstruction of said E1 signal.

11. A cellular telephone network according to claim 1, wherein at least one of said peripheral branches comprises a satellite link and an E1 – TCP/IP interface.

12. A branch of a cellular telephone network based on a first synchronous data communication protocol, comprising interfaces to a satellite link using a second, asynchronous, data communication protocol, wherein said interfaces comprise converters for converting data between said first data communication protocol and said second data communication protocol.

13. A branch according to claim 12, wherein said interfaces are arranged to provide said satellite link as a parallel path to a terrestrial data link.

14. A branch according to claim 12, said interfaces comprising encoders for encoding synchronization control information of said first protocol when encoding data of said first protocol into said second protocol, thereby to enable reconstruction of a signal in said first protocol from data in said second protocol, which reconstructed data retains said synchronization.

15. A branch according to claim 12, comprising at least one base station connected to at least one mobile switching center, said at least one mobile switching center being associated with at least one location register, and wherein said satellite link is arranged to connect said at least one mobile switching center with said at least one location register.

16. A branch according to claim 12, said interfaces comprising decoders operable to decode synchronization control information from data arriving from said link, to reconstruct a synchronized telephony protocol data stream.

17. A branch according to claim 16, said interface further comprising a buffer controllable according to said decoded synchronization information to recreate time delay relationships of said telephony protocol data stream.

18. A branch according to claim 12, said telephony protocol allowing non-data carrying time slots, and said interfaces comprising a non-data carrying time slot remover for removing said non-data carrying time slots during conversion into said asynchronous protocol and a time slot regenerator for regenerating non-data carrying time slots during reconstruction of said telephony protocol datastream.

19. A hub for connecting to a satellite link, said hub being associated with an interface for interfacing between a synchronous telephone data protocol and an asynchronous satellite data protocol, thereby to allow telephone data to be sent via said satellite link.

20. A hub according to claim 19, wherein said interface comprises a multiplexer for converting between said telephone data protocol and said satellite data protocol, and an encoder for encoding timing information of said telephone data protocol.

21. A hub according to claim 20, operable to send said data via geostationary satellites.

22. An interface for interfacing between an E1 data network and a TCP/IP data network, the interface comprising a multiplexer for converting between E1 and TCP/IP data formats and comprising an encoder for encoding timing information of said E1 format when encoding E1 data into TCP/IP data and a buffer for recreating E1 synchronization when converting said data back into E1 data.

23. A method of managing an E1-based telephone network using a combination of E1 and TCP/IP high speed data links each having a given capacity, the method comprising:

routing data directly via said E1 data links until their capacity is filled,

converting excess data to TCP/IP format and routing via TCP/IP high speed data links, and

reconverting said excess data to E1 format at a destination end of said TCP/IP high speed data links.

24. A method according to claim 23 wherein converting and reconverting are carried out by multiplexing said excess data.

25. A method according to claim 23, wherein said TCP/IP high speed data links comprise satellite data links.

26. A method according to claim 25, wherein said satellite data links utilize satellites in geostationary orbit.

27. A communication backbone comprising high capacity E1 links and high capacity TCP/IP links and E1 – TCP/IP converters therebetween.

28. A communication backbone according to claim 27 wherein said high capacity TCP/IP data links comprise satellite links.

29. The use of synchronization preserving E1 - TCP/IP protocol conversion to allow interconnection of geostationary satellite links and Internet backbone links with mobile telephone networks to form a unified network.

30. A series of TCP/IP data packets each having a packet header comprising timing information to allow reconstruction of said series as an E1 stream, the packets each carrying SS#7 data payload.

31. An E1-TCP/IP data converter comprising a packager operable to package said E1 data as a series of independent packets and an encoder operable to insert within each one of said independent packets, header information indicating synchronization information of said packet as part of said E1 data.

32. An E1 – TCP/IP data converter according to claim 31, wherein said packager comprises a filter for identifying and discarding empty E1 time slots.

33. An E1 – TCP/IP data converter according to claim 32, said filter further comprising a filter encoder for encoding positions of said discarded slots.

34. An E1 – TCP/IP data converter according to claim 32, said filter being operable to discard predetermined time slots.

35. A TCP/IP –E1 data reconverter comprising an input buffer for receiving TCP/IP packaged E1 data as a series of unsynchronized TCP/IP packets,

a header reader for reading E1 synchronization data from said packets,

and a reconstructor for using said E1 synchronization data to provide a reconstruction of an original E1 data stream from said TCP/IP data packets.

36. A TCP/IP –E1 data reconverter according to claim 35, wherein said E1 synchronization data comprises information of discarded timeslots and wherein said reconstructor is operable to regenerate said discarded timeslots for insertion into said reconstructed E1 data stream.